

GODDARD SPACE FLIGHT CENTER

Test Lab Report Summary

<i>Report Number:</i>	Q10148DPA	<i>Project:</i>	SWIFT
<i>Part Type:</i>	Microcircuit	<i>System:</i>	BAT
<i>Part Number:</i>	AD623AR	<i>Initiated Date:</i>	05/01/2001
<i>Date Code:</i>	0033	<i>Report Date:</i>	09/14/2001
<i>Manufacturer:</i>	Analog Devices, Inc.	<i>Investigator:</i>	C. Greenwell (562)
<i>Generic Number:</i>	AD623	<i>Requester:</i>	B. Meinhold (562)
<i>Purchase Spec:</i>	Commercial	<i>Approval / Date:</i>	

Step 1: INCOMING INSPECTION

<u>Test</u>	<u>Quantity</u>	<u>Passed</u>	<u>Failed</u>
External Visual	N/A	N/A	N/A
PIND Condition A	N/A	N/A	N/A

Step 2: DESTRUCTIVE PHYSICAL ANALYSIS

Destructive Physical Analysis (DPA) was conducted per GSFC document "Plastic Encapsulated Microcircuit (PEM) Guidelines for Screening and Qualification for Space Applications", except that cross-section was done without dye penetrant and glassivation integrity testing was not performed.

No rejectable defects or anomalies were observed during this analysis.

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Summary of Analysis:

	<i>Serial Number</i>	<u>E01</u>	<u>E03</u>	<u>F01</u>	<u>F03</u>	<u>G04</u>
<i>External Examination</i>						
1. Markings - legibility and correctness _____		A	A	A	A	A
2. Integrity of package seals _____		N/A	N/A	N/A	N/A	N/A
3. Condition of external leads and plating _____		A	A	A	A	A
4. Overall package condition _____		A	A	A	A	A
<i>Radiographic Examination</i>						
5. Die bonding material and die alignment _____		A	A	A	A	A
6. Package seal integrity _____		N/A	N/A	N/A	N/A	N/A
7. Presence of foreign material _____		A	A	A	A	A
8. Lead dress (if revealed) _____		A	A	A	A	A
<i>Acoustic Microscopy Inspection</i>						
9. Condition of material interfaces (delaminations) _____		A	A	A	A	A
10. Condition of molding material (voids, cracks) _____		A	A	A	A	A
<i>Internal Examination (including cross-section)</i>						
11. Presence of foreign material _____		A	A	A	A	A
12. Mechanical condition of die _____		A	A	A	A	A
13. Wire bonds and lead dress _____		N/P	N/P	A	A	A
14. Die bonding material _____		A	A	A	A	A
15. Condition of die surface _____		N/P	N/P	A	A	A
16. Condition of metallization _____		N/P	N/P	A	A	A
17. SEM Examination _____		A	A	A	A	A
<i>Bond Strength</i>						
18. Strength _____		N/P	N/P	A	A	A
19. Metallization adherence _____		N/P	N/P	A	A	A
<i>Die Bond Strength</i>						
20. Strength _____		N/P	N/P	N/P	N/P	N/P

SN's E01 and E03 subjected to cross-sectional examination.

(* = Refer to comments, A = acceptable, U = unacceptable, N/A = not applicable, N/P = not performed)

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Appended Photographs:

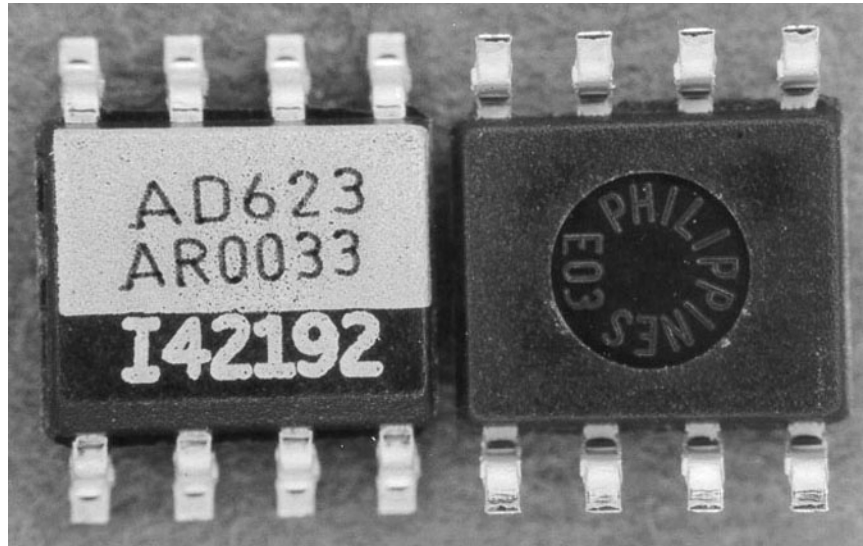


Figure 1. External top and bottom views of the AD623AR devices. 8X

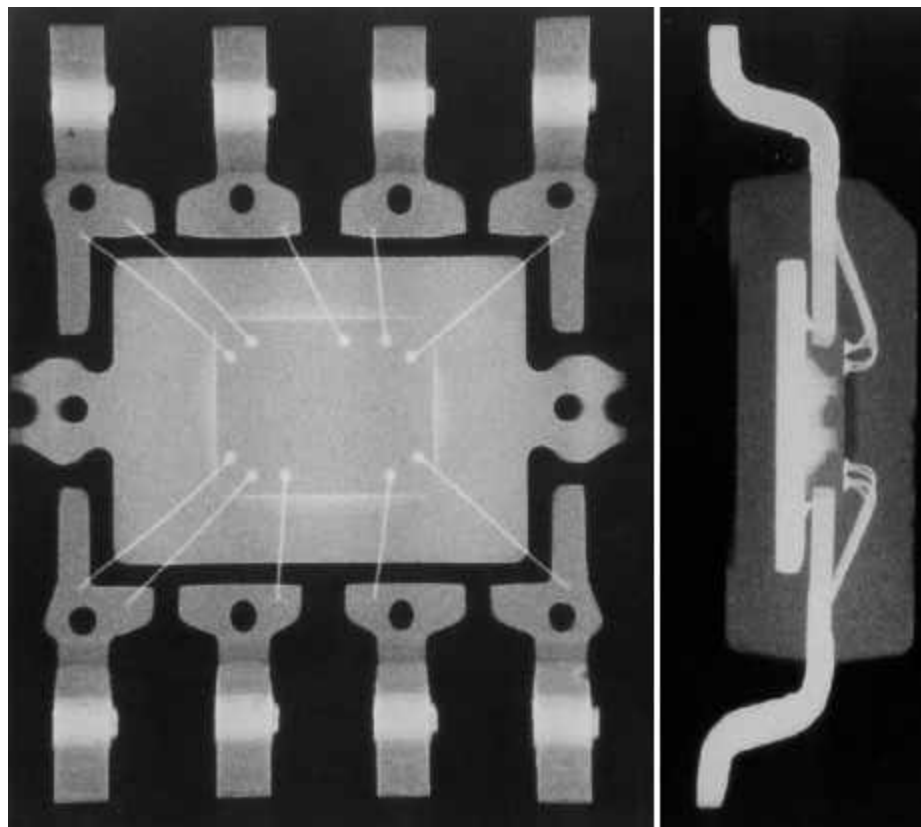


Figure 2. Top and side view radiographic images. Note the die glob-top material visible in the side view (dark area over the die). 14X

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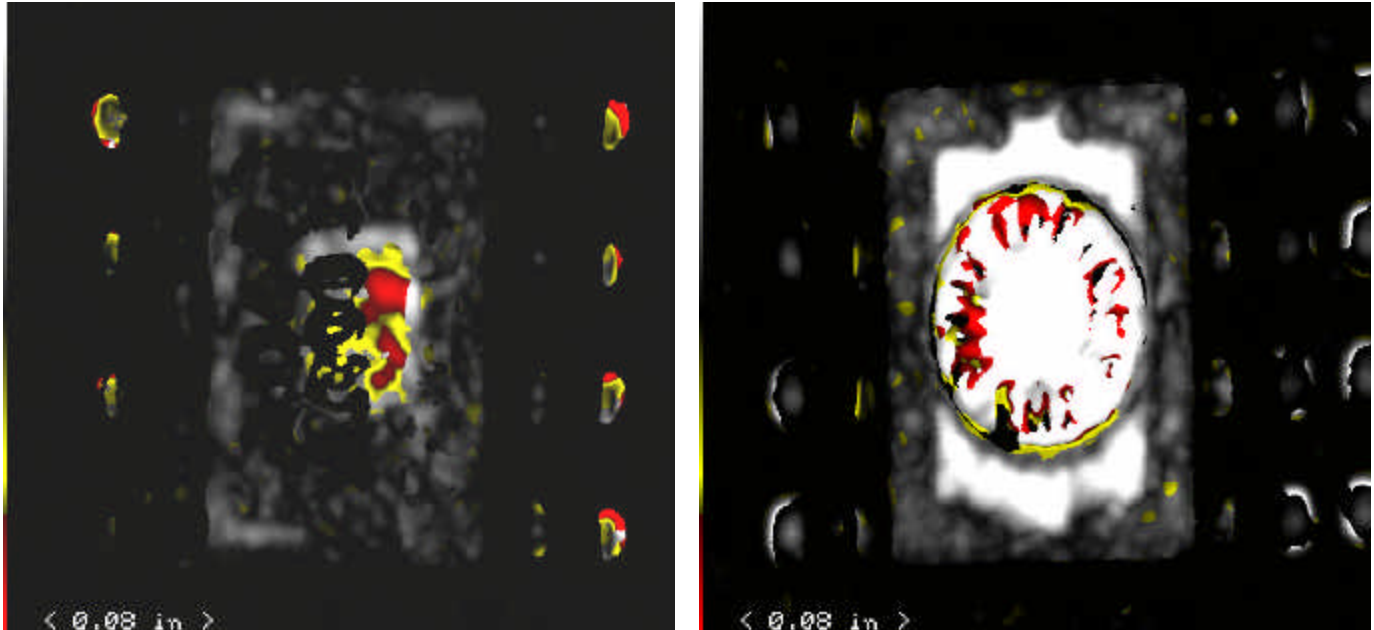


Figure 3. Top (left) and bottom C-SAM images of SN E01. The glob-top material produces artifacts that make ultrasonic inspection from the topside less useful than otherwise could be. The part markings are also visible in these images.

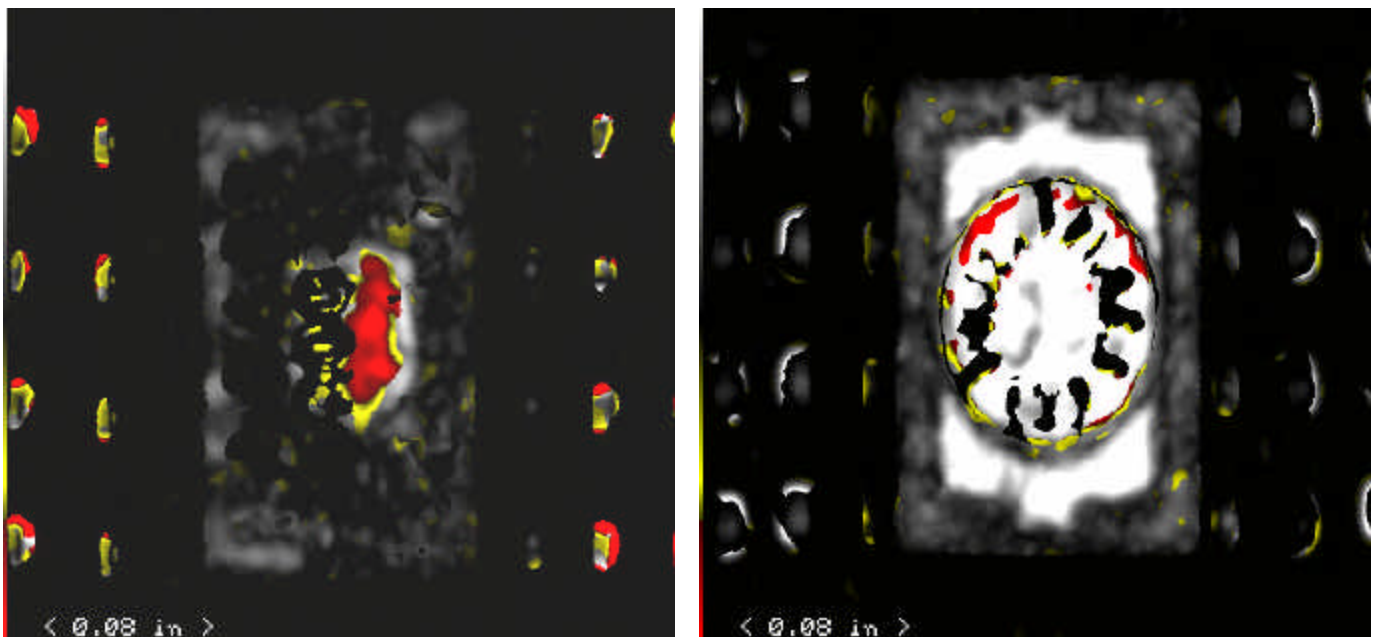


Figure 4. Top (left) and bottom C-SAM images of SN E03.

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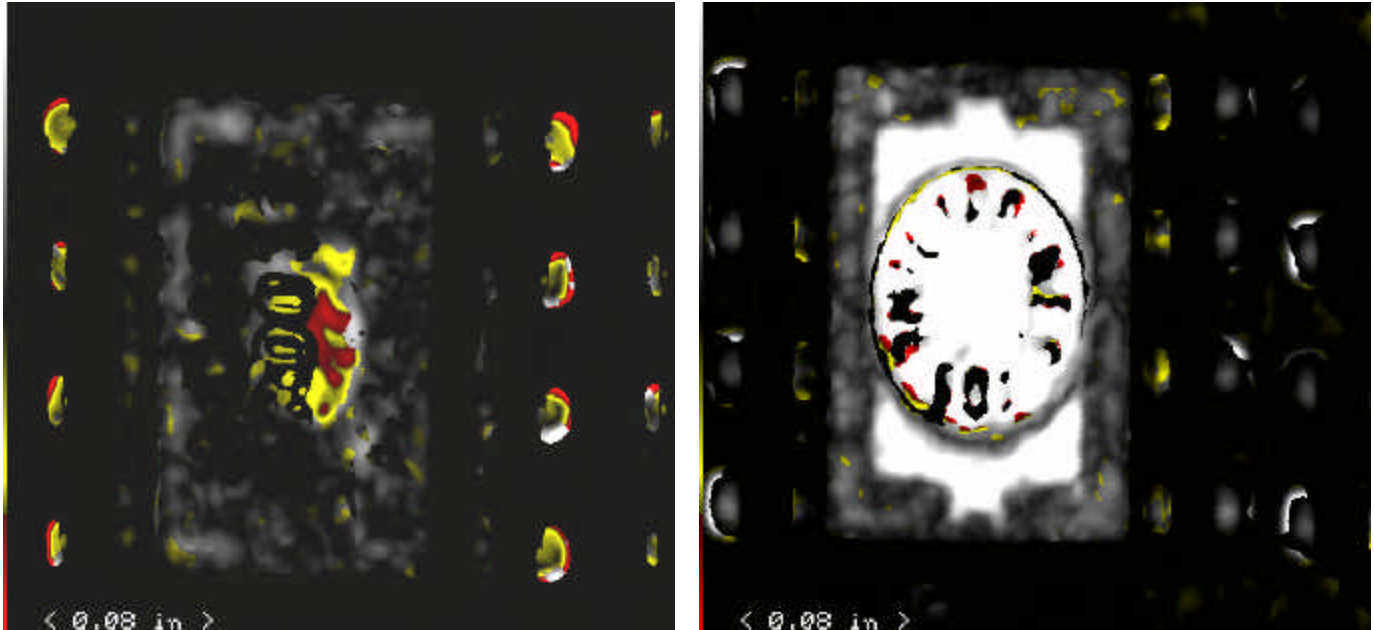


Figure 5. Top (left) and bottom C-SAM images of SN F01.

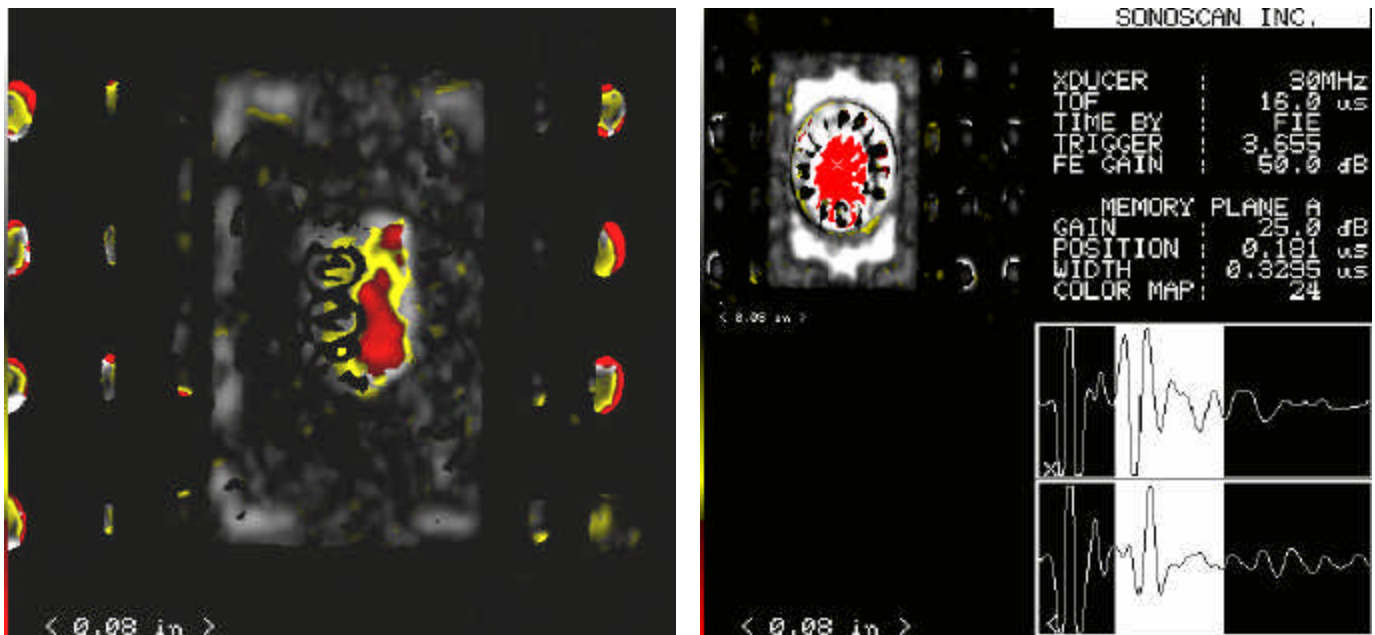


Figure 6. Top (left) and bottom C-SAM images of SN F03. This device shows (acceptable) delamination between the mold material and bottom side of the die paddle.

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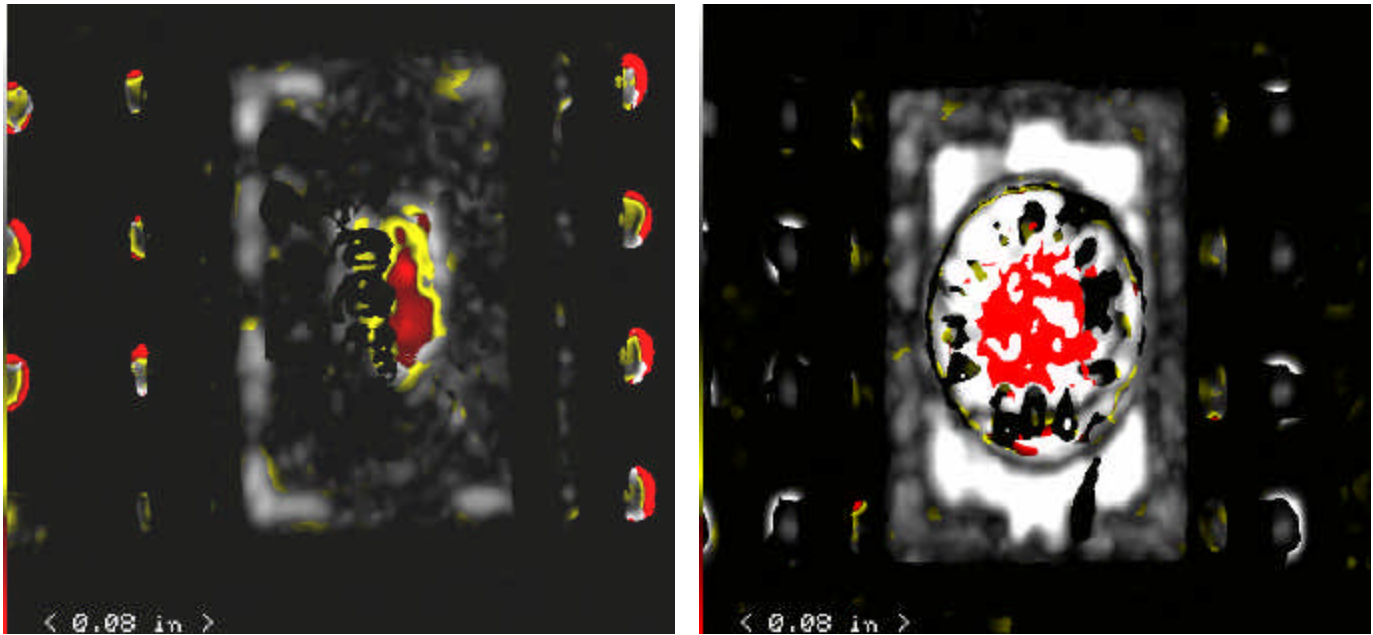


Figure 7. Top (left) and bottom C-SAM images of SN G04.

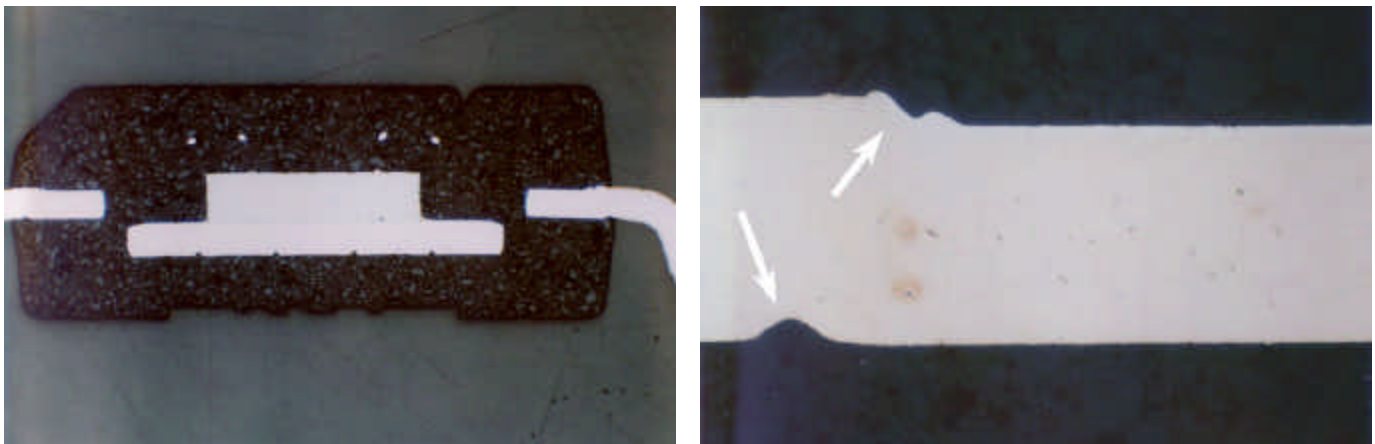


Figure 8. Cross-section images of SN E03. The left image (26X) shows overall view. The right image (210X) shows anchoring features on a lead frame finger.

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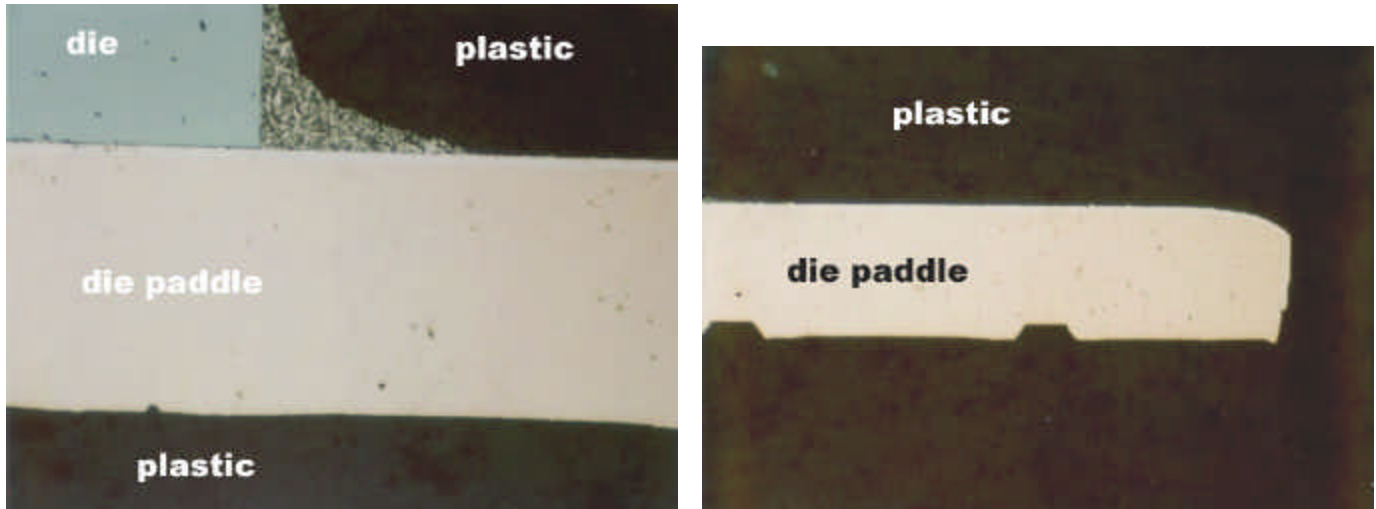


Figure 9. Cross-section images of SN E01. The left image (210X) shows an area of the die and die paddle and the interface between the plastic and these structures. The right image (106X) shows anchoring features on the die paddle bottom side.

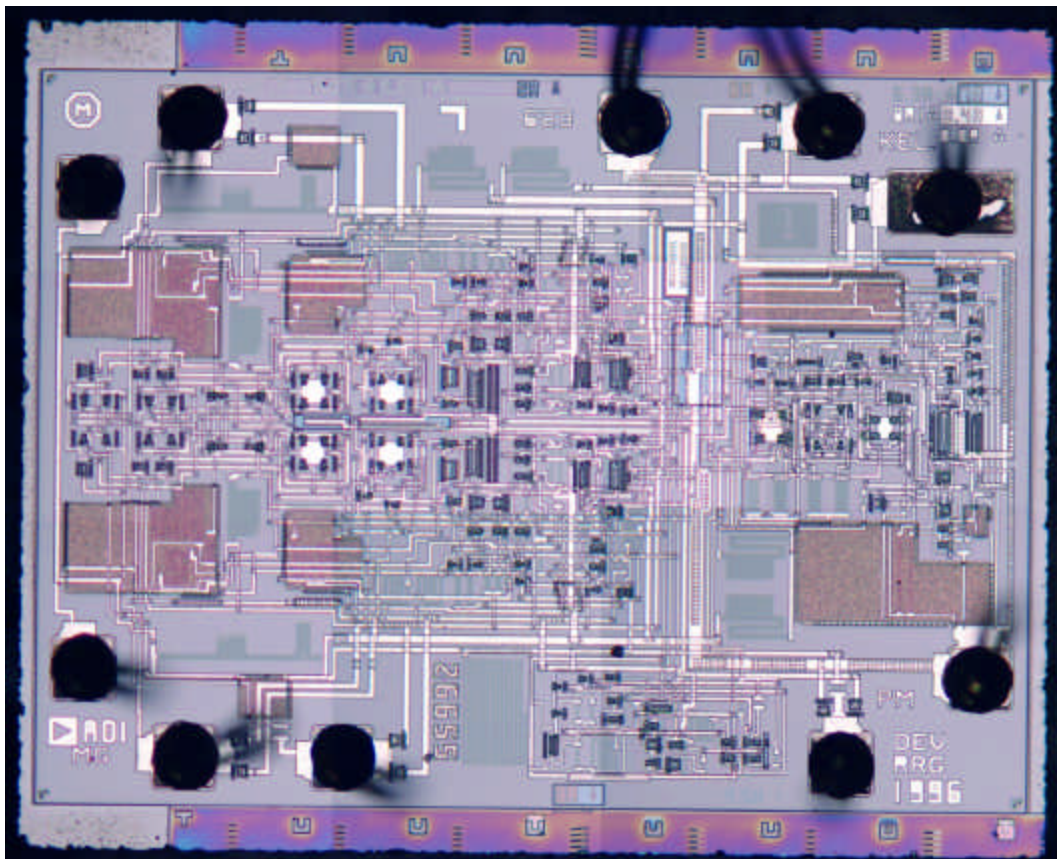


Figure 10. Overall optical image of SN F03 die.

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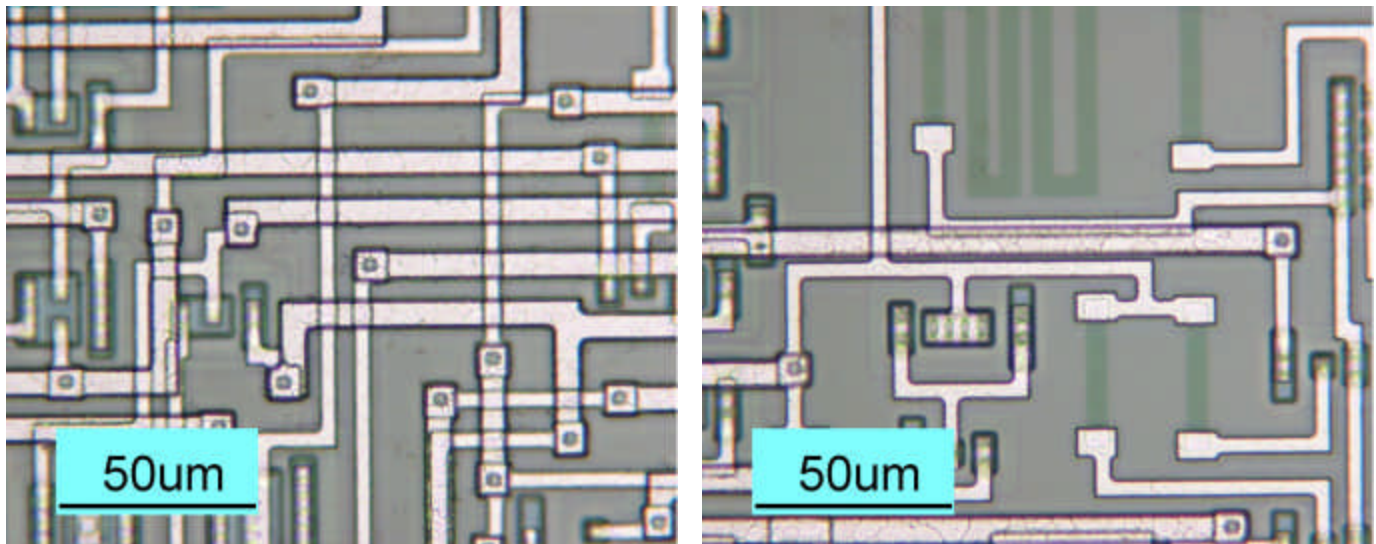


Figure 11. Optical micrograph images show typical features on SN F01 die.

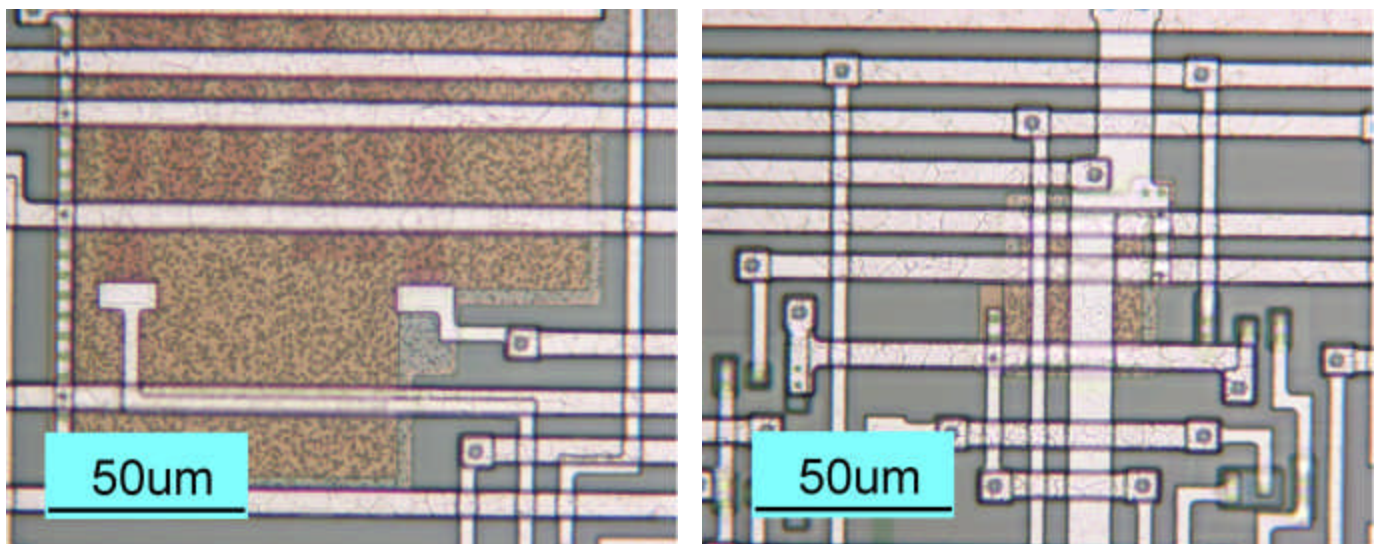


Figure 12. Optical micrograph images of SN F03.

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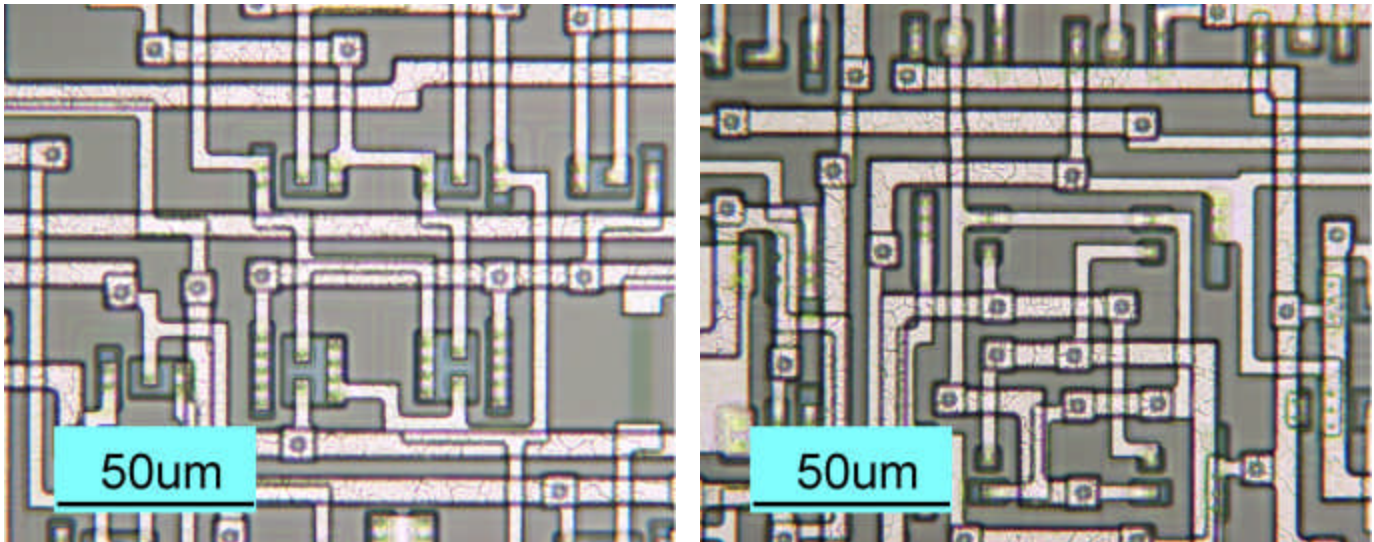


Figure 13. Optical micrograph images of SN G04.

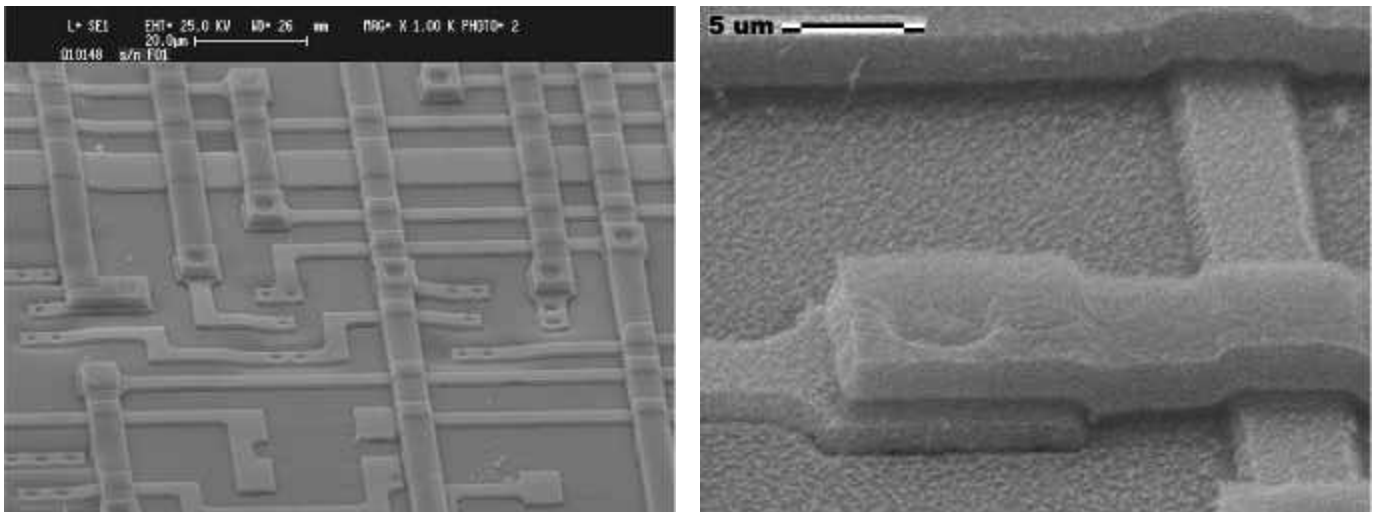


Figure 14. SEM micrographs of SN F01 show general metal and typical step coverage.

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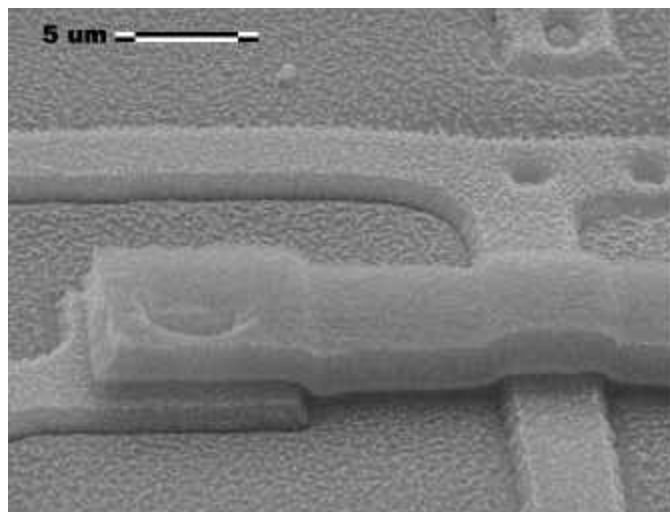
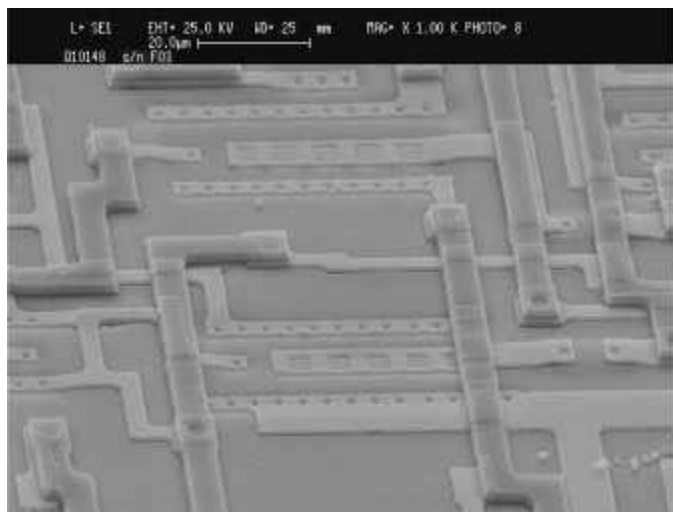


Figure 15. SEM micrographs show metallization features on SN F03.

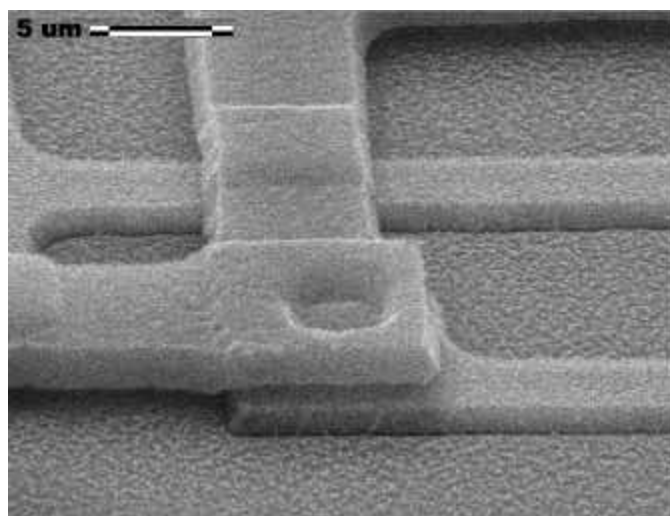
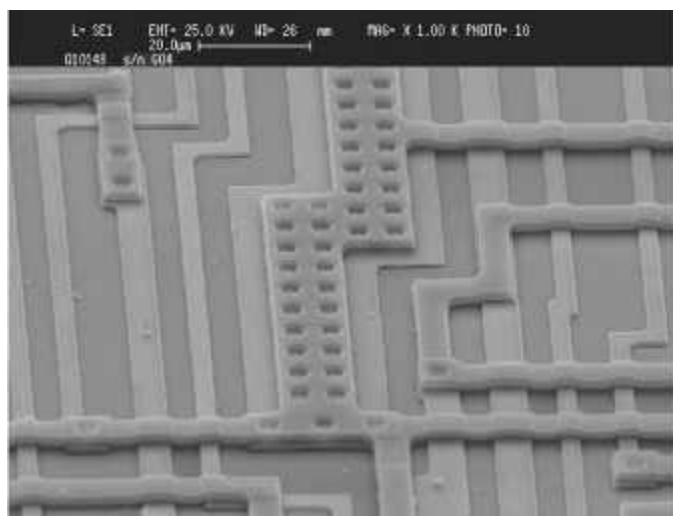


Figure 16. SEM micrographs show metallization features on SN G04.